Disentangling Sources of Anomalous Diffusion

Felix Thiel[1]*, Franziska Flegel[1], Igor M. Sokolov[1]

[1]Humboldt-Universität zu Berlin, Institut für Physik, Berlin, Germany
*thiel@posteo.de

In contrast to normal behaviour, the mean squared displacement of anomalous diffusive processes grows nonlinearly in time. There are a multitude of mathematical models describing such behaviour and several mechanisms causing it. In practice those sources of the anomaly may be at work simultaneously and it is important to tell them apart. We show that by using the so-called fundamental moment, which is the moment additive in time, two mechanisms, coined structural and energetic disorder, can be separated. This method enables us to split up the stationary and non-stationary components of the diffusion process. It is demonstrated in computer simulations of a random potential model.

References

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